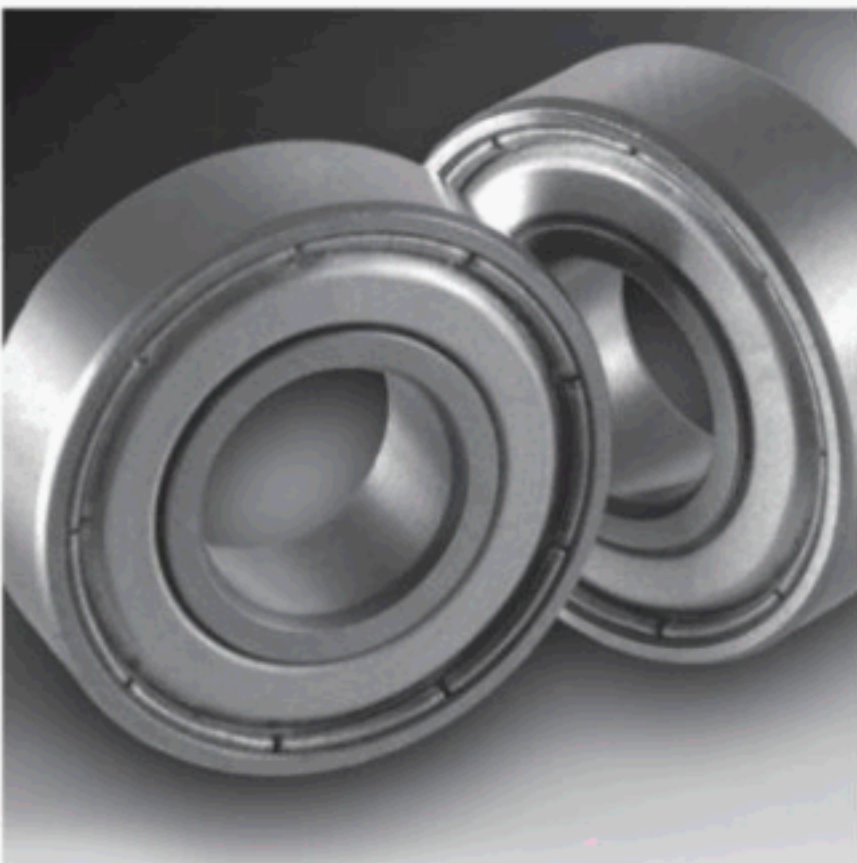


ANSI/ABMA 7: 1995 (Stabilized Maint. 2013)

AMERICAN NATIONAL STANDARD

***Accredited Standards
Committee B3***



Shaft and Housing Fits for Metric Radial Ball and Roller Bearings (Except Tapered Roller Bearings) Conforming to Basic Boundary Plan



Secretariat

**American Bearing
Manufacturers Association**

ANSI/ABMA 7: 1995

Stabilized Maintenance 2013



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Published by

American Bearing Manufacturers Association

2025 M Street, N.W., Suite 800

Washington, DC 20036

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Printed in the United States of America

**AMERICAN NATIONAL STANDARD
ABMA STANDARD
SHAFT AND HOUSING FITS FOR METRIC RADIAL BALL AND ROLLER BEARINGS
(EXCEPT TAPERED ROLLER BEARINGS)
CONFORMING TO BASIC BOUNDARY PLAN**

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SHAFT AND HOUSING FITS FOR METRIC RADIAL BALL AND ROLLER BEARINGS (EXCEPT TAPERED ROLLER BEARINGS) CONFORMING TO BASIC BOUNDARY PLAN

1. Scope

This standard covers the general selection of shaft and housing fits for metric radial ball and roller bearings of tolerance classes ABEC 1 - RBEC 1 as influenced by the type and extent of bearing loading and other design requirements. Other tolerance classes are not covered by this standard.

Recommendations for the fitting practices of some particular types of ball and roller bearings are covered in other ANSI/ABMA standards. These include:

ANSI/ABMA Std. No.	
12.1 & 12.2	Instrument Ball Bearings
16.1 & 16.2	Airframe Ball, Roller, and Needle Roller Bearings
18.1 & 18.2	Needle Roller Bearings
19.1 & 19.2	Tapered Roller Bearings
26.2	Thin Section Ball Bearings

This standard can also be used as a guide for determining shaft and housing dimensions for inch design ball and roller bearings by using the recommended shaft and housing fits for metric bearings and applying the appropriate bore and O.D. tolerances for the inch design bearings, except those bearings covered by ANSI/ABMA Standard 15.

2. Conformity with Other ANSI Standards

In the size range 0-2500 mm, the deviations used in this standard for shaft and housing seats conform to American National Standard ANSI B4.2, "Preferred Metric Limits and Fits".

3. Description of Shaft and Housing Tolerance Classifications

In the size range described in 2 above, the tolerance classifications are designated by a letter and a numeral. A lower case letter is used for shafts and a capital letter is used for housings. Numerals indicate the degree of accuracy - the smaller numerals representing closer tolerances than the larger. The letters indicate the location of the shaft and housing limits relative to the inner ring bore and outer ring outside diameter tolerance ranges indicated in Figures 1 and 2 by the symbols KB and hB respectively.

Figures 1 and 2 show graphically how the various tolerance classifications result in clearance or interference depending upon how the diameters of the mating parts interact in specific cases.

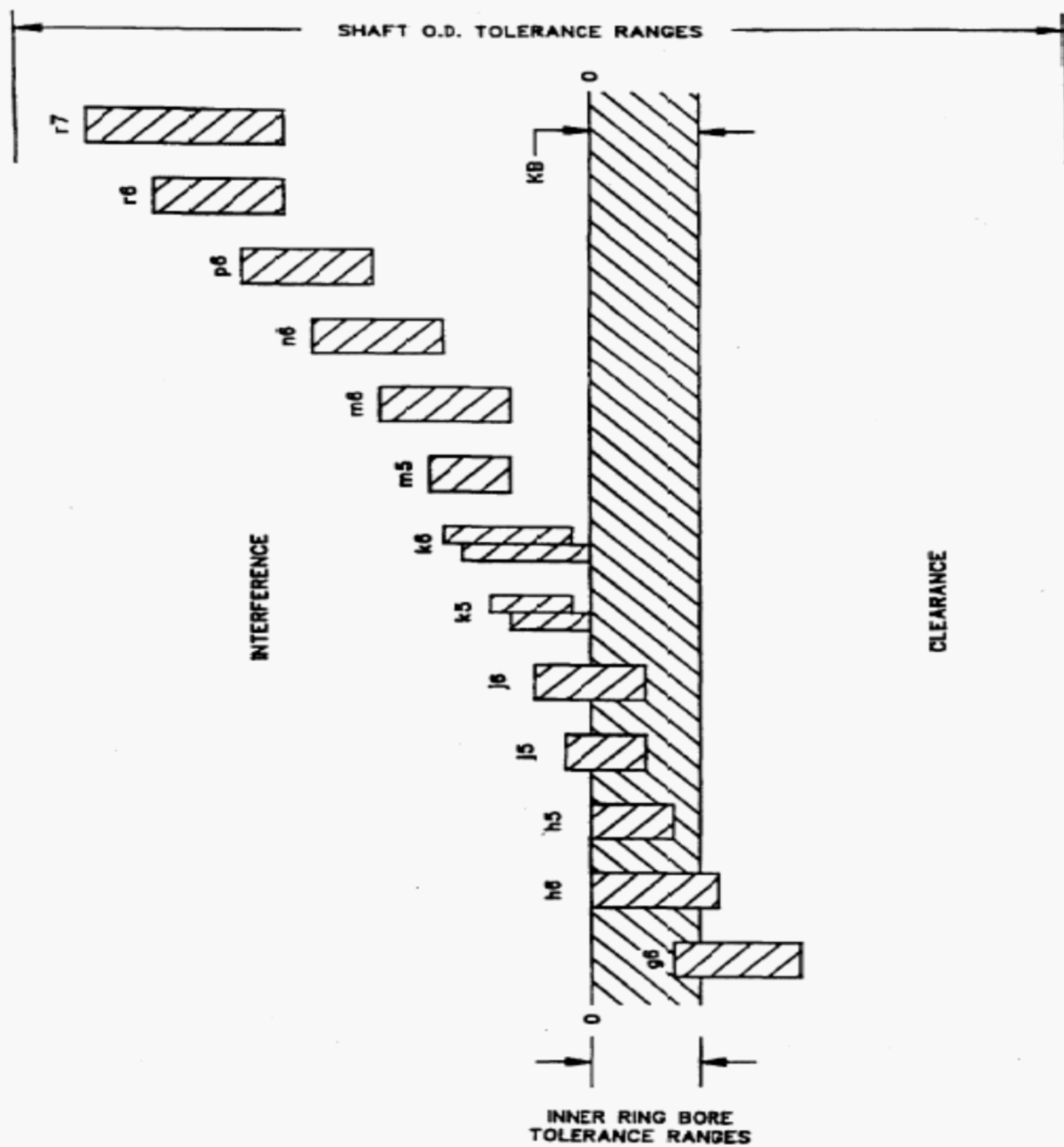


Figure 1 Graphical representation of shaft fits

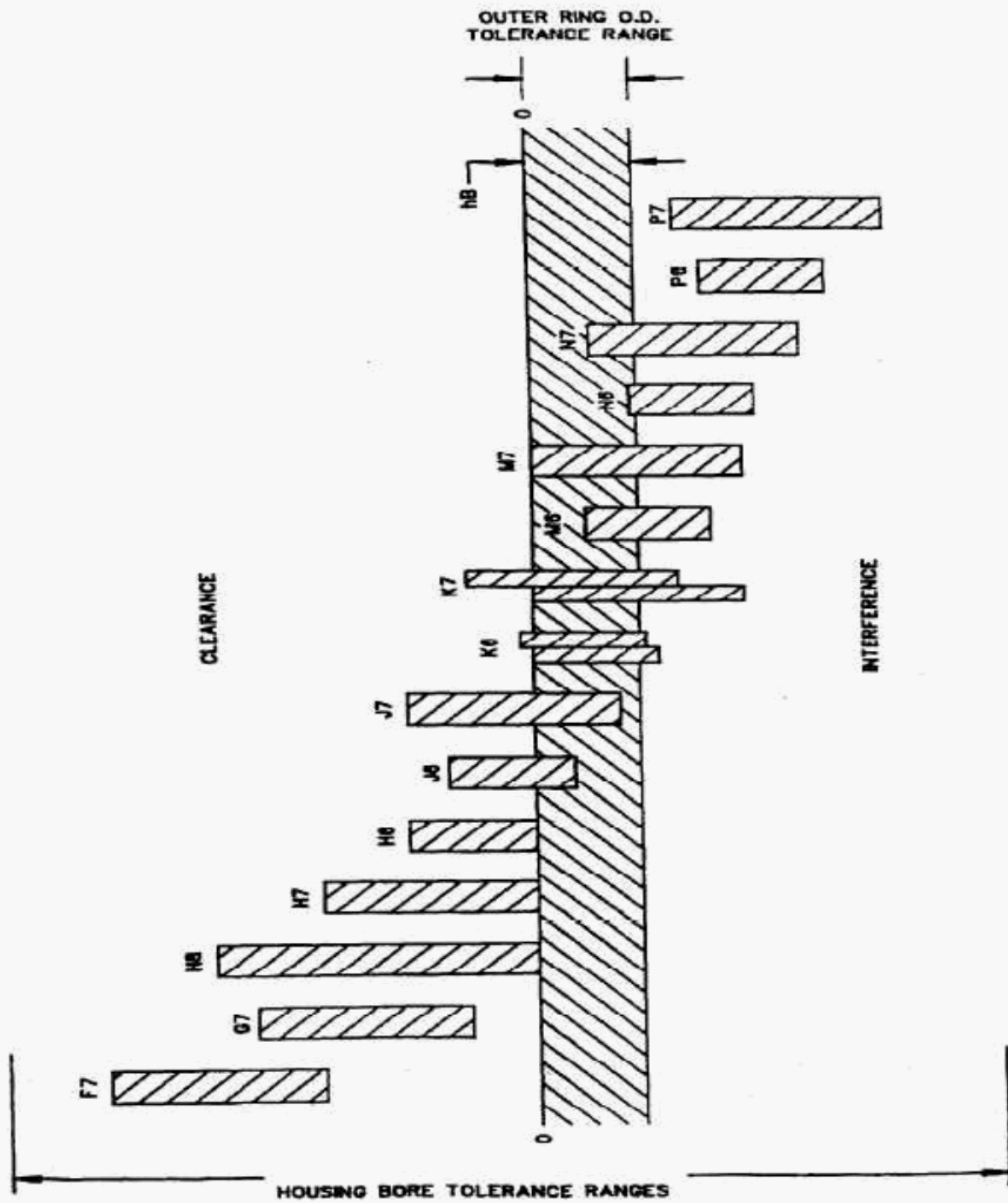


Figure 2 Graphical representation of housing fits

4. Selection of Shaft and Housing Fits

To select the proper fits, it is necessary to consider the type and extent of the load, bearing type, and certain other design and performance requirements.

The required shaft and housing fits are indicated in Tables 1 and 3. The terms "Light", "Normal" and "Heavy" loads refer to radial loads that are generally related to C_r as shown in Figure 3 (C_r , being the Basic Dynamic Radial Load Rating computed in accordance with ANSI/ABMA Standards).

4.1 Shaft Fits. Table 1 indicates the initial approach to shaft fit selection. Note that for most normal applications where the shaft rotates and the radial load direction is constant, an interference fit should be used. Also, the heavier the load, the greater is the required interference. For stationary shaft conditions and constant radial load direction, the inner ring may be moderately loose on the shaft.

Table 2 shows the shaft diameter deviations and resultant fits for the various tolerance classifications for bore sizes over 3 mm and up to 1250 mm.

4.2 Housing Fits. Table 3 indicates the initial approach to housing fit selection. Note that the use of clearance or interference fits is mainly dependent upon which bearing ring rotates in relation to the radial load. For indeterminate or varying load directions, avoid clearance fits. Clearance fits are preferred in axially split housings to avoid distorting bearing outer rings. The extent of the radial load also influences the choice of fit.

Table 4 shows the housing bore deviations and resultant fits for the various tolerance classifications for outer diameter sizes over 10 mm and up to 2500 mm.

5. Design and Installation Considerations

5.1 Effect of Fit on Bearing Internal Clearance. Since interference fitting will reduce bearing radial internal clearance, it is recommended that prospective users consult bearing manufacturers to make certain that the required bearings are correctly specified to satisfy all mounting, environmental and other operating conditions and requirements. This is particularly necessary in those cases where heat sources in associated parts may further diminish bearing clearances in operation.

Standard values of radial internal clearances of radial bearings are listed in ANSI/ABMA Standard 20.

5.2 Allowance for Axial Displacement. Consideration should be given to axial displacement of bearing components due to thermal expansion or contraction of associated parts. Displacement may be accommodated either by the internal construction of the bearing or by allowing one of the bearing rings to be axially displaceable. For unusual applications consult bearing manufacturers.

5.3 Installation Techniques. Damage to internal bearing surfaces may result from the transmission of mounting forces through the rolling elements. Therefore, methods and tools should be used that apply these forces directly to the ring or rings being interference fitted.

To facilitate the installation of bearings on their seatings with interference fits, bearings or housings, as the case requires, may be thermally expanded by heating under controlled conditions. Bearing temperatures should not be allowed to exceed 120°C (250°F) to avoid reducing bearing hardness.

Heating of pre-lubricated bearings should be avoided to prevent deterioration of the lubricant. Alternatively, shafts or bearings may be chilled to provide sufficient contraction to facilitate installation. The bearing manufacturer should be contacted for information on low temperature limit and methods of cooling. Precautions should be observed to avoid corrosion through the creation of excessive atmospheric moisture condensation on bearings or other parts during this process.

6. Symbols and Nomenclature

The following symbols and nomenclature are used in this standard.

d = basic bore diameter

D = basic outside diameter

C_r = basic dynamic radial load rating for a radial or angular contact ball bearing or for a radial roller bearing*

P = equivalent radial load*

* See ANSI/ABMA Standards 9 and 11 for additional information about how these values are determined.

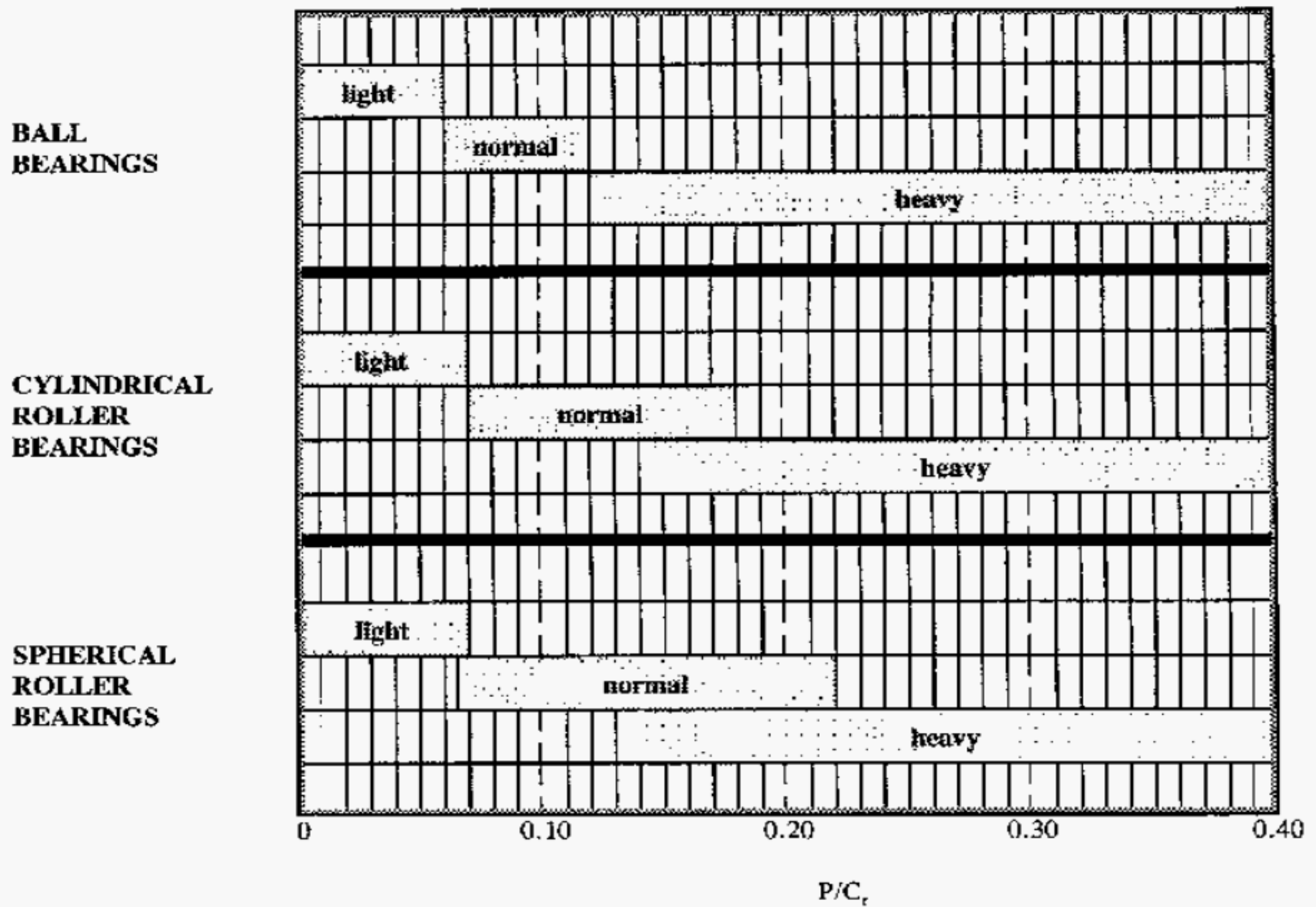


Figure 3 - Classification of Load (P) in Relation to Basic Load Rating (C_r) *

* Basic dynamic radial load rating C_r based on standard materials and one million revolutions

TABLE 1
SELECTION OF SHAFT TOLERANCE CLASSIFICATIONS
FOR METRIC RADIAL BALL AND ROLLER BEARINGS
OF TOLERANCE CLASSES ABEC-1, RBEC-1

Part I

Dimensions in millimetres

DESIGN & OPERATING CONDITIONS			BALL BEARINGS			CYLINDRICAL ROLLER BEARINGS			SPHERICAL ROLLER BEARINGS		
Rotational Conditions	Inner Ring Axial Displaceability	Radial Loading	d		Tolerance Classification (1)	d		Tolerance Classification (1)	d		Tolerance Classification (1)
			Over	Incl.		Over	Incl.		Over	Incl.	
<u>Inner Ring Rotating</u> in relation to Load Direction or <u>Load Direction</u> is Indeter- minate		Light	0 18	18 All	h5 j6 (2)	0	40	j6(2)	0	40	j6(2)
						400	140	k6(2)	40	100	k6(2)
						140	320	m6(2)	100	320	m6(2)
						320	500	n6	320	500	n6
						500	All	p6	500	All	p6
		Normal	0 18	18 All	j5 k5	0	40	k5	0	40	k5
						400	100	m5	40	65	m5
						100	140	m6	65	100	m6
						140	320	n6	100	140	n6
						320	500	p6	140	280	p6
		Heavy	18 100	100 All	k5 m5	500	All	r6	280	500	r6
								r7	500	All	r7
0	40					m5	0	40	m5		
40	65					m6	40	65	m6		
65	140					n6	65	100	n6		
<u>Inner Ring Stationary</u> in Relation to Load Direction	Inner Ring must be easily axially displaceable	Light	All Sizes	g6	All Sizes		g6	All Sizes		g6	
		Normal									
		Heavy									
	Inner Ring need not be easily axially displaceable	Light	All sizes	h6	All Sizes		h6	All Sizes		h6	
		Normal									
		Heavy									
Pure Thrust (Axial) Load			All Sizes		j6	Consult Bearing Manufacturer					

- (1) Tolerance Classifications shown are for solid steel shaft.. Numerical values are listed in Table 2.
For hollow or nonferrous shafts, tighter fits may be needed.
- (2) If greater accuracy is needed, substitute j5, k5 and m5 for j6, k6, and m6 respectively.

TABLE 1
SELECTION OF SHAFT TOLERANCE CLASSIFICATIONS
FOR METRIC RADIAL BALL AND ROLLER BEARINGS
OF TOLERANCE CLASSES ABEC-1, RBEC-1

Part II

Dimensions in inches

DESIGN & OPERATING CONDITIONS			BALL BEARINGS			CYLINDRICAL ROLLER BEARINGS			SPHERICAL ROLLER BEARINGS		
Rotational Conditions	Inner Ring Axial Displaceability	Radial Loading	d		Tolerance Classification (1)	d		Tolerance Classification (1)	d		Tolerance Classification (1)
			Over	Incl.		Over	Incl.		Over	Incl.	
Inner Ring Rotating in relation to Load Direction or Load Direction is Indeter- minate		Light	0 0.71	0.71 All	h5 j6 (2)	0	1.57	j6(2)	0	1.57	j6(2)
						1.57	5.51	k6(2)	1.57	3.94	k6(2)
						5.51	12.6	m6(2)	3.94	12.6	m6(2)
						12.6	19.7	n6	12.6	19.7	n6
						19.7	All	p6	19.7	All	p6
		Normal	0 0.71	0.71 All	j5 k5	0	1.57	k5	0	1.57	k5
						1.57	3.94	m5	1.57	2.56	m5
						3.94	5.51	m6	2.56	3.94	m6
						5.51	12.6	n6	3.94	5.51	n6
						12.6	19.7	p6	5.51	11.0	p6
						19.7	All	r6	11.0	19.7	r6
		Heavy	0.71 3.94	3.94 All	k5 m5	0	1.57	m5	0	1.57	m5
						1.57	2.56	m6	1.57	2.56	m6
						2.56	5.51	n6	2.56	3.94	n6
						5.51	7.87	p6	3.94	5.51	p6
						7.87	19.7	r6	5.51	7.87	r6
						19.7	All	r7	7.87	All	r7
Inner Ring Stationary in Relation to Load Direction	Inner Ring must be easily axially displaceable	Light	All Sizes	g6	All Sizes	g6	All Sizes	g6			
		Normal									
		Heavy									
	Inner Ring need not be easily axially displaceable	Light	All sizes	h6	All Sizes	h6	All Sizes	h6			
		Normal									
		Heavy									
Pure Thrust (Axial) Load			All Sizes		j6	Consult Bearing Manufacturer					

- (1) Tolerance Classifications shown are for solid steel shaft.. Numerical values are listed in Table 2.
For hollow or nonferrous shafts, tighter fits may be needed.
- (2) If greater accuracy is needed, substitute j5, k5 and m5 for j6, k6, and m6 respectively.

TABLE 2
SHAFT FITTING PRACTICE
FOR METRIC RADIAL BALL AND ROLLER BEARINGS
OF TOLERANCE CLASSES ABEC-1, RBEC-1

Dimensions in Millimetres
 Deviations and Fits in Micrometres

Part I

Deviations and Fits in Micrometres

d		TOLERANCE CLASSIFICATIONS																									
		g6		h6		h5		j5		j6		k5		k6		m5		m6		n6		p6		r6		r7	
over	incl.	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit
3	6	0 -4 -8	12L 4T	0 -8	8L 8T	0 -5	5L 8T	+3 -2	2L 11T	+6 -2	2L 14T	+6 +1	1T 14T			+9 +4	4T 17T										
6	10	0 -5 -14	14L 3T	0 -9	9L 8T	0 -6	6L 8T	+4 -2	2L 12T	+7 -2	2L 15T	+7 +1	1T 15T			+12 +6	6T 20T										
10	18	0 -6 -17	17L 2T	0 -11	11L 8T	0 -8	8L 8T	+5 -3	3L 13T	+8 -3	3L 16T	+9 +1	1T 17T			+15 +7	7T 23T										
18	30	0 -7 -20	20L 3T	0 -13	13L 10T			+5 -4	4L 15T	+9 -4	4L 19T	+11 +2	2T 21T			+17 +8	8T 27T										
30	50	0 -9 -25	25L 3T	0 -16	16L 12T			+6 -5	5L 18T	+11 -5	5L 23T	+13 +2	2T 25T			+20 +9	9T 32T										
50	80	0 -10 -29	29L 5T	0 -19	19L 15T			+6 -7	7L 21T	+12 -7	7L 27T	+15 +2	2T 30T			+24 +11	11T 39T	+39 +20	20T 45T								
80	120	0 -12 -34	34L 8T	0 -22	22L 20T			+6 -9	9L 26T	+13 -9	9L 33T	+18 +3	3T 38T			+28 +13	13T 48T	+45 +23	23T 55T								
120	180	0 -14 -39	39L 11T	0 -25	25L 25T			+7 -11	11L 32T	+14 -11	11L 39T	+21 +3	3T 46T			+33 +15	15T 58T	+52 +27	27T 65T								
180	200	0 -15 -44	44L 15T	0 -29	29L 30T			+7 -13	13L 37T	+16 -13	13L 46T	+24 +4	4T 54T			+37 +17	17T 67T	+60 +31	31T 90T	+79 +50	50T 109T						
200	225	0 -15 -44	44L 15T	0 -29	29L 30T			+7 -13	13L 37T	+16 -13	13L 46T	+24 +4	4T 54T			+37 +17	17T 67T	+60 +31	31T 90T	+79 +50	50T 109T						
225	250	0 -15 -44	44L 15T	0 -29	29L 30T			+7 -13	13L 37T	+16 -13	13L 46T	+24 +4	4T 54T			+37 +17	17T 67T	+60 +31	31T 90T	+79 +50	50T 109T						
250	280	0 -17 -49	49L 18T	0 -32	32L 35T			+7 -16	16L 42T	+16 -16	16L 51T	+27 +4	4T 62T			+43 +20	20T 78T	+66 +34	34T 101T	+88 +56	56T 123T						
280	315	0 -17 -49	49L 18T	0 -32	32L 35T			+7 -16	16L 42T	+16 -16	16L 51T	+27 +4	4T 62T			+43 +20	20T 78T	+66 +34	34T 101T	+88 +56	56T 123T						
315	355	0 -18 -54	54L 22T	0 -36	36L 40T			+7 -18	18L 47T	+18 -18	18L 58T	+29 +4	4T 69T			+46 +21	21T 86T	+73 +37	37T 113T	+98 +62	62T 138T						
355	400	0 -18 -54	54L 22T	0 -36	36L 40T			+7 -18	18L 47T	+18 -18	18L 58T	+29 +4	4T 69T			+46 +21	21T 86T	+73 +37	37T 113T	+98 +62	62T 138T						
400	450	0 -20 -60	60L 25T	0 -40	40L 45T			+7 -20	20L 52T	+20 -20	20L 65T	+32 +5	5T 77T			+50 +23	23T 95T	+80 +40	40T 125T	+108 +68	68T 153T						
450	500	0 -20 -60	60L 25T	0 -40	40L 45T			+7 -20	20L 52T	+20 -20	20L 65T	+32 +5	5T 77T			+50 +23	23T 95T	+80 +40	40T 125T	+108 +68	68T 153T						
500	560	0 -22 -66	66L 28T	0 -44	44L 50T			+8 -22	22L 58T	+22 -22	22L 72T	+30 0	0 80T			+56 +26	26T 106T	+88 +48	48T 128T	+122 +78	78T 172T						
560	630	0 -22 -66	66L 28T	0 -44	44L 50T			+8 -22	22L 58T	+22 -22	22L 72T	+30 0	0 80T			+56 +26	26T 106T	+88 +48	48T 128T	+122 +78	78T 172T						
630	710	0 -24 -74	74L 31T	0 -50	50L 75T			+10 -25	25L 85T	+25 -25	25L 100T	+35 0	0 110T			+65 +30	30T 140T	+100 +60	60T 160T	+138 +88	88T 213T						
710	800	0 -24 -74	74L 31T	0 -50	50L 75T			+10 -25	25L 85T	+25 -25	25L 100T	+35 0	0 110T			+65 +30	30T 140T	+100 +60	60T 160T	+138 +88	88T 213T						
800	900	0 -26 -82	82L 34T	0 -56	56L 100T			+12 -28	28L 112T	+28 -28	28L 128T	+40 0	0 140T			+74 +34	34T 174T	+120 +70	70T 194T	+156 +100	100T 256T						
900	1000	0 -26 -82	82L 34T	0 -56	56L 100T			+12 -28	28L 112T	+28 -28	28L 128T	+40 0	0 140T			+74 +34	34T 174T	+120 +70	70T 194T	+156 +100	100T 256T						
1000	1120	0 -28 -94	94L 37T	0 -66	66L 125T			+13 -33	33L 138T	+33 -33	33L 158T	+46 0	0 171T			+86 +40	40T 211T	+130 +80	80T 241T	+186 +120	120T 311T						
1120	1250	0 -28 -94	94L 37T	0 -66	66L 125T			+13 -33	33L 138T	+33 -33	33L 158T	+46 0	0 171T			+86 +40	40T 211T	+130 +80	80T 241T	+186 +120	120T 311T						

L = Loose, T = Tight

TABLE 2
SHAFT FITTING PRACTICE
FOR METRIC RADIAL BALL AND ROLLER BEARINGS
OF TOLERANCE CLASSES ABEC-1, RBEC-1

Dimensions in Inches
 Deviations and Fits in 0.0001 Inches

Part II
Deviations and Fits in 0.0001 Inches

TOLERANCE CLASSIFICATIONS

d			TOLERANCE CLASSIFICATIONS																										
over	incl.	Deviation	g6		h6		h5		j5		j6		k5		k6		m5		m6		n6		p6		r6		r7		
			Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	Shaft Deviation	Resultant Fit	
0.1181	0.2362	0	-2	5L	0	3L	0	2L	+1	1L	+2	1L	+2	0T			+4	2T											
		-3	-5	1T	-3	3T	-2	3T	-1	4T	-1	5T	0	5T			+2	7T											
0.2362	0.3937	0	-2	6L	0	4L	0	2L	+2	1L	+3	1L	+3	0T			+5	2T											
		-3	-6	1T	-4	3T	-2	3T	-1	5T	-1	6T	0	6T			+2	8T											
0.3937	0.7087	0	-2	7L	0	4L	0	3L	+2	1L	+3	1L	+4	0T			+6	3T											
		-3	-7	1T	-4	3T	-3	3T	-1	5T	-1	6T	0	7T			+3	9T											
0.7087	1.1811	0	-3	8L	0	5L			+2	2L	+4	2L	+4	1T			+7	3T											
		-4	-8	1T	-5	4T			-2	6T	-2	8T	+1	8T			+3	11T											
1.1811	1.9685	0	-4	10L	0	6L			+2	2L	+4	2L	+5	1T			+8	4T											
		-4.5	-10	0.5T	-6	4.5T			-2	6.5T	-2	8.5T	+1	9.5T			+4	12.5T	+4										
1.9685	3.1496	0	-4	11L	0	7L			+2	3L	+5	3L	+6	1T			+9	4T											
		-6	-11	2T	-7	6T			-3	8T	-3	11T	+1	12T			+4	15T											
3.1496	4.7244	0	-5	13L	0	9L			+2	4L	+5	4L	+7	1T			+11	5T											
		-8	-13	3T	-9	8T			-4	10T	-4	13T	+1	15T			+5	19T											
4.7244	7.0866	0	-6	15L	0	10L			+3	4L	+6	4L	+8	1T			+13	6T											
		-10	-15	4T	-10	10T			-4	13T	-4	16T	+1	18T			+6	23T											
7.0866	7.8740	0	-6	17L	0	11L			+3	5L	+6	5L	+9	2T			+15	7T											
		-12	-17	5T	-11	12T			-5	15T	-5	18T	+2	21T			+7	27T											
7.8740	8.8583	0	-6	17L	0	11L			+3	5L	+6	5L	+9	2T			+15	7T											
		-12	-17	6T	-11	12T			-5	15T	-5	18T	+2	21T			+7	27T											
8.8583	9.8425	0	-6	17L	0	11L			+3	5L	+6	5L	+9	2T			+15	7T											
		-12	-17	6T	-11	12T			-5	15T	-5	18T	+2	21T			+7	27T											
9.8425	11.0236	0	-7	19L	0	13L			+3	6L	+6	6L	+11	2T			+17	8T											
		-14	-19	7T	-13	14T			-6	17T	-6	20T	+2	25T			+8	31T											
11.0236	12.4016	0	-7	19L	0	13L			+3	6L	+6	6L	+11	2T			+17	8T											
		-14	-19	7T	-13	14T			-6	17T	-6	20T	+2	25T			+8	31T											
12.4016	13.9764	0	-7	21L	0	14L			+3	7L	+7	7L	+11	2T			+18	8T											
		-16	-21	9T	-14	16T			-7	19T	-7	23T	+2	27T			+8	34T											
13.9764	15.7480	0	-7	21L	0	14L			+3	7L	+7	7L	+11	2T			+18	8T											
		-16	-21	9T	-14	16T			-7	19T	-7	23T	+2	27T			+8	34T											
15.7480	17.7165	0	-8	24L	0	16L			+3	8L	+8	8L	+13	2T			+20	9T											
		-18	-24	10T	-16	18T			-8	21T	-8	26T	+2	31T			+9	38T											
17.7165	19.6850	0	-8	24L	0	16L			+3	8L	+8	8L	+13	2T			+20	9T											
		-18	-24	10T	-16	18T			-8	21T	-8	26T	+2	31T			+9	38T											
19.6850	22.0472	0	-9	26L	0	17L			+3	9L	+9	9L	+12	0			+22	10T											
		-20	-26	11T	-17	20T			-9	23T	-9	29T	+2	32T			+10	42T											
22.0472	24.8031	0	-9	26L	0	17L			+3	9L	+9	9L	+12	0			+22	10T											
		-20	-26	11T	-17	20T			-9	23T	-9	29T	+2	32T			+10	42T											
24.8031	27.9528	0	-9	29L	0	20L			+4	10L	+10	10L	+14	0			+26	12T											
		-30	-29	21T	-20	30T			-10	34T	-10	40T	+2	44T			+12	56T											
27.9528	31.4961	0	-9	29L	0	20L			+4	10L	+10	10L	+14	0			+26	12T											
		-30	-29	21T	-20	30T			-10	34T	-10	40T	+2	44T			+12	56T											
31.4961	35.4331	0	-10	32L	0	22L			+5	11L	+11	11L	+16	0			+29	13T											
		-39	-32	29T	-22	39T			-11	44T	-11	50T	+2	55T			+13	68T											
35.4331	39.3701	0	-10	32L	0	22L			+5	11L	+11	11L	+16	0			+29	13T											
		-39	-32	29T	-22	39T			-11	44T	-11	50T	+2	55T			+13	68T											
39.3701	44.0945	0	-11	37L	0	26L			+5	13L	+13	13L	+18	0			+34	16T											
		-49	-37	38T	-26	49T			-13	54T	-13	62T	+2	67T			+16	83T											
44.0945	49.2126	0	-11	37L	0	26L			+5	13L	+13	13L	+18	0			+34	16T											
		-49	-37	38T	-26	49T			-13	54T	-13	62T	+2	67T			+16	83T											

L = Loose, T = Tight

TABLE 3
SELECTION OF HOUSING TOLERANCE CLASSIFICATIONS
FOR METRIC RADIAL BALL AND ROLLER BEARINGS
OF TOLERANCE CLASSES ABEC-1, RBEC-1

DESIGN AND OPERATING CONDITIONS				TOLERANCE CLASSIFICATION (1)
Rotational Conditions	Loading	Other Conditions	Outer Ring Axial Displaceability	
<u>Outer Ring Stationary</u> in relation to load direction	Light Normal or Heavy	Heat input through shaft	Outer ring easily axially displaceable	G7 (3)
		Housing split axially		H7 (2)
	Shock with temporary complete unloading	Housing not split axially		H6 (2)
				J6 (2)
<u>Load Direction</u> indeterminate	Light	Split not recommended	Transitional range (4)	
	Normal or Heavy			K6 (2)
	Heavy shock			M6 (2)
<u>Outer Ring Rotating</u> in relation to load direction	Light			N6 (2)
	Normal or heavy			
	Heavy	Thin wall housing not split	Outer ring not easily axially displaceable	P6 (2)

- (1) For cast iron steel housings. Numerical values are listed in Table 4. For housings of non-ferrous alloys tighter fits may be needed.
- (2) Where wider tolerances are permissible, use tolerance classifications H8, H7, J7, K7, M7, N7 and P7 in place of H7, H6, J6, K6, M6, N6 and P6 respectively.
- (3) For large bearings and temperature differences between outer ring and housings greater than 10 degrees C, F7 may be used instead of G7.
- (4) The tolerance zones are such that outer ring may be either tight or loose in the housing.

TABLE 4
HOUSING FITTING PRACTICE
FOR METRIC RADIAL BALL AND ROLLER BEARINGS
OF TOLERANCE CLASSES ABEC-1, RBEC-1

Dimensions in Millimetres
Deviations and Fits in Micrometres

d		TOLERANCE CLASSIFICATIONS																													
		F7		G7		H8		H7		H6		J6		J7		K6		K7		M6		M7		N6		N7		P6		P7	
over	incl.	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit	Housing Deviation	Result- tant Fit
10	18	+0	+16	+34	+6	+24	+6	+10	+2	+6	+15	+18	+20	+23	+26	+29	31	29	31	29	31	29	31	29	31	29	31	29	31	29	31
18	30	+0	+20	+41	+7	+28	+5	+12	+2	+6	+17	+21	+24	+28	+31	+35	51	29	51	29	51	29	51	29	51	29	51	29	51	29	51
30	50	+0	+25	+50	+9	+34	+6	+14	+3	+7	+20	+25	+28	+33	+37	+42	61	42	61	42	61	42	61	42	61	42	61	42	61	42	61
50	80	+0	+30	+60	+10	+40	+10	+18	+4	+9	+24	+30	+33	+39	+45	+51	81	51	81	51	81	51	81	51	81	51	81	51	81	51	81
80	120	+0	+36	+71	+12	+47	+12	+22	+4	+10	+30	+37	+40	+48	+56	+64	91	59	91	59	91	59	91	59	91	59	91	59	91	59	91
120	150	+0	+43	+83	+14	+54	+14	+24	+5	+12	+36	+43	+47	+57	+66	+76	101	68	101	68	101	68	101	68	101	68	101	68	101	68	101
150	180	+0	+43	+83	+14	+54	+14	+24	+5	+12	+36	+43	+47	+57	+66	+76	68	31	68	31	68	31	68	31	68	31	68	31	68	31	68
180	250	+0	+50	+96	+15	+61	+15	+24	+6	+15	+42	+50	+54	+64	+74	+84	79	31	79	31	79	31	79	31	79	31	79	31	79	31	79
250	315	+0	+56	+108	+17	+69	+17	+27	+7	+18	+48	+56	+60	+70	+80	+90	88	11	88	11	88	11	88	11	88	11	88	11	88	11	88
315	400	+0	+62	+119	+18	+75	+18	+28	+8	+20	+54	+62	+66	+76	+86	+96	98	11	98	11	98	11	98	11	98	11	98	11	98	11	98
400	500	+0	+68	+131	+20	+83	+20	+30	+9	+22	+60	+68	+72	+82	+92	+102	108	11	108	11	108	11	108	11	108	11	108	11	108	11	108
500	630	+0	+76	+146	+22	+92	+22	+32	+10	+25	+66	+76	+80	+90	+100	+110	148	28	148	28	148	28	148	28	148	28	148	28	148	28	148
630	800	+0	+80	+160	+24	+104	+24	+34	+11	+28	+72	+80	+84	+94	+104	+114	168	13	168	13	168	13	168	13	168	13	168	13	168	13	168
800	1000	+0	+86	+176	+26	+116	+26	+36	+12	+30	+76	+86	+90	+100	+110	+120	190	19	190	19	190	19	190	19	190	19	190	19	190	19	190
1000	1250	+0	+98	+203	+28	+133	+28	+38	+13	+32	+80	+98	+102	+112	+122	+132	225	51	225	51	225	51	225	51	225	51	225	51	225	51	225
1250	1600	+0	+110	+235	+30	+155	+30	+40	+14	+36	+86	+110	+114	+124	+134	+144	265	20	265	20	265	20	265	20	265	20	265	20	265	20	265
1600	2000	+0	+120	+270	+32	+182	+32	+42	+15	+38	+90	+120	+124	+134	+144	+154	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
2000	2500	0	+130	+305	+34	+209	+34	+44	+16	+40	+96	+130	+134	+144	+154	+164	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55

L = Loose, T = Tight

TABLE 4
HOUSING FITTING PRACTICE
FOR METRIC RADIAL BALL AND ROLLER BEARINGS
OF TOLERANCE CLASSES ABEC-1, RBEC-1

Dimensions in Inches
Deviations and Fits in 0.0001 Inches

d		TOLERANCE CLASSIFICATIONS																	
		F7	G7	H7	H6	J6	J7	K6	K7	M6	M7	N6	N7	P6	P7				
over	Incl.	Housing Deviation	Resultant Fit	Housing Deviation	Resultant Fit	Housing Deviation	Resultant Fit	Housing Deviation	Resultant Fit	Housing Deviation	Resultant Fit	Housing Deviation	Resultant Fit	Housing Deviation	Resultant Fit	Housing Deviation	Resultant Fit	Housing Deviation	Resultant Fit
0.3937	0.7087	+6 +13	+2 +9	0 +7	0 +4	-2 +2	-3 +4	-4 +1	-5 +2	-6 +2	-7 +0	-8 +4	-9 +3	-10 +2	-11 +1	-12 +0	-13 +0	-14 +0	-15 +0
0.7087	1.1811	+8 +16	+3 +11	0 +8	0 +5	-2 +3	-4 +5	-4 +1	-6 +2	-7 +2	-8 +1	-9 +0	-10 +0	-11 +0	-12 +0	-13 +0	-14 +0	-15 +0	-16 +0
1.1811	1.9685	+10 +20	+4 +13	0 +10	0 +6	-2 +4	-4 +6	-5 +1	-7 +3	-8 +2	-9 +1	-10 +0	-11 +0	-12 +0	-13 +0	-14 +0	-15 +0	-16 +0	-17 +0
1.9685	3.1496	+12 +24	+4 +16	0 +12	0 +7	-2 +5	-4 +7	-6 +2	-8 +4	-9 +3	-10 +2	-11 +1	-12 +0	-13 +0	-14 +0	-15 +0	-16 +0	-17 +0	-18 +0
3.1496	4.7244	+14 +28	+5 +19	0 +14	0 +9	-2 +6	-4 +9	-7 +2	-9 +5	-10 +4	-11 +3	-12 +2	-13 +1	-14 +0	-15 +0	-16 +0	-17 +0	-18 +0	-19 +0
4.7244	5.9055	+17 +33	+6 +21	0 +16	0 +10	-3 +7	-6 +10	-8 +3	-11 +6	-12 +5	-13 +4	-14 +3	-15 +2	-16 +1	-17 +0	-18 +0	-19 +0	-20 +0	-21 +0
5.9055	7.0866	+17 +33	+6 +21	0 +16	0 +10	-3 +7	-6 +10	-8 +3	-11 +6	-12 +5	-13 +4	-14 +3	-15 +2	-16 +1	-17 +0	-18 +0	-19 +0	-20 +0	-21 +0
7.0866	9.8425	+20 +38	+6 +24	0 +18	0 +11	-3 +9	-6 +12	-9 +3	-12 +7	-13 +6	-14 +5	-15 +4	-16 +3	-17 +2	-18 +1	-19 +0	-20 +0	-21 +0	-22 +0
9.8425	12.4016	+22 +43	+7 +27	0 +20	0 +13	-3 +10	-6 +14	-11 +4	-14 +8	-15 +7	-16 +6	-17 +5	-18 +4	-19 +3	-20 +2	-21 +1	-22 +0	-23 +0	-24 +0
12.4016	15.7480	+24 +47	+7 +30	0 +22	0 +14	-3 +11	-6 +15	-11 +5	-14 +9	-15 +8	-16 +7	-17 +6	-18 +5	-19 +4	-20 +3	-21 +2	-22 +1	-23 +0	-24 +0
15.7480	19.6850	+27 +52	+8 +33	0 +25	0 +16	-3 +13	-6 +17	-11 +6	-14 +10	-15 +9	-16 +8	-17 +7	-18 +6	-19 +5	-20 +4	-21 +3	-22 +2	-23 +1	-24 +0
19.6850	24.8031	+30 +57	+9 +36	0 +28	0 +17	-3 +15	-6 +19	-11 +7	-14 +11	-15 +10	-16 +9	-17 +8	-18 +7	-19 +6	-20 +5	-21 +4	-22 +3	-23 +2	-24 +1
24.8031	31.4961	+31 +63	+9 +41	0 +31	0 +20	-4 +16	-9 +22	-20 +7	-31 +10	-30 +9	-31 +8	-32 +7	-33 +6	-34 +5	-35 +4	-36 +3	-37 +2	-38 +1	-39 +0
31.4961	39.3701	+34 +69	+10 +46	0 +34	0 +22	-4 +18	-10 +25	-22 +10	-35 +13	-34 +12	-35 +11	-36 +10	-37 +9	-38 +8	-39 +7	-40 +6	-41 +5	-42 +4	-43 +3
39.3701	49.2126	+39 +80	+11 +52	0 +41	0 +26	-4 +22	-11 +30	-26 +11	-41 +16	-40 +15	-41 +14	-42 +13	-43 +12	-44 +11	-45 +10	-46 +9	-47 +8	-48 +7	-49 +6
49.2126	62.9921	+43 +93	+12 +61	0 +49	0 +31	-4 +27	-12 +37	-31 +12	-49 +17	-48 +16	-49 +15	-50 +14	-51 +13	-52 +12	-53 +11	-54 +10	-55 +9	-56 +8	-57 +7
62.9921	78.7402	+47 +106	+13 +72	0 +59	0 +36	-4 +32	-13 +46	-36 +13	-59 +20	-58 +19	-59 +18	-60 +17	-61 +16	-62 +15	-63 +14	-64 +13	-65 +12	-66 +11	-67 +10
78.7402	94.4252	+51 +120	+13 +82	0 +69	0 +43	-4 +39	-13 +56	-43 +13	-69 +23	-68 +22	-69 +21	-70 +20	-71 +19	-72 +18	-73 +17	-74 +16	-75 +15	-76 +14	-77 +13

L = Loose, T = Tight

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